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Exams on Computer: Results of Trials of SQA Digital Question Papers

Paul D. Nisbet

Abstract

This paper describes the development and trial of digital question papers by pupils with additional support needs, including dyslexia, sitting Scottish Qualification Authority (SQA) examinations. Digital papers were developed and then used by pupils in 'live' Scottish Standard Grade, Intermediate and Higher examinations in 2006 and again in 2007. The trials were evaluated and marks achieved by pupils analysed. Results indicate that the papers were reliable; pupils preferred using the digital papers to conventional methods of support, such as reader or scribe; and teachers believe that demands on staffing and accommodation are in general reduced.

Introduction

Since 1995 there has been a 340% increase in the number of requests for 'Assessment Arrangements' for candidates sitting Scottish Qualifications Authority (SQA) examinations: from 3,094 candidates in 1995, to 10,660 in 2006 (SQA 2006). Approximately 7% of all candidates sitting SQA examinations now use Assessment Arrangements. It is likely that this increase has been due to a number of factors, including improvements in professional practice and provision and also the impact of legislation such as the Disability Discrimination Act 1995, and the Disability Equality Duty. Assessment Arrangements (previously 'Alternative Assessment Arrangements' and 'Special Arrangements') are intended to 'ensure that all candidates have an equal opportunity to show that they can achieve the national standards required for Units and Courses' (SQA 2007). The majority of the candidates for whom assessment arrangements are requested are described as having specific learning difficulties including dyslexia (Table 1) (Source: SQA Annual Statistical Reports 2003, 2004, 2005, 2006; www.sqa.org.uk).

	2003		2004		2005		2006	
Difficulty	Candidates	Entries	Candidates	Entries	Candidates	Entries	Candidates	Requests
Specific Learning Difficulties	5,742	27,532	6,660	31,545	6,625	28,419	6,965	29,002
Various other difficulties (including temporary difficulties)	2,506	11,116	3,238	13,563	2,531	10,122	3,393	12,932
Visual difficulties	102	535	473	2,084	713	2,913	302	1,357
Total	8,350	39,183	10,371	47,192	9,869	41,454	10,660	43,291

Table 1: Number of candidates and entries for whom Assessment Arrangements were requested

Schools and centres who present candidates for examinations may request the use of appropriate assessment arrangements to meet the specific needs of the candidate and the assessment. There were 43,291 requests made in 2006 on behalf of the 10,660 candidates, and in most cases, presenting centres requested more than one type of support (Table 2). The most common type of support requested was Extra Time (34,803 requests) followed by the use of a reader (16,815 requests) and then use of a scribe (15,059) (Source: data provided by SQA to the author).

Type of support requested	No of requests
Extra Time	34,803
Reader	16,815
Scribe	15,059
Use of ICT	3,063
PA Referral	2,480
Coloured Paper	1,327
Transcription with correction	1,190
Calculator	892
Enlarged Print	889
Transcription without correction	678
Question Paper signed to candidate	69
Candidate Signs Responses	56
Braille	28
Use of tape recorder for responses	25

Table 2: SQA Assessment Arrangements requests, 2006

Centres may request the paper to be supplied by SQA in an alternative format such as Braille, Large Print, Modified print, and on coloured paper to suit the needs of the candidate. In 2006, 5,369 individual adapted format question papers were provided (Table 3 (SQA 2006 p. 13).

Type of Adapted Paper	No of papers provided
White paper	1662
Large Print	1071
Colour copies	938
N14 – N18 font	562
Reader copy	408
N20 –N28 font	259
Adapted content	139
N36 – N48 font	104
Digital question papers	146
Braille	80

Table 3: Types of Adapted Paper provided, 2006

The Adapted Digital Question papers were developed in response to a number of factors and observations. Firstly, many pupils with additional support needs routinely use assistive technology in school and at home to access the curriculum: they should therefore also be able to use the same technology in an examination, provided that this does not give the candidate an unfair advantage. Secondly, use of information and communication technology (ICT) offers a more independent method of writing than using a scribe, which is clearly relevant in an assessment context. Thirdly, the widespread use of readers and scribes is expensive in terms of staffing and accommodation given that each pupil requires the amanuensis, a separate room, and an invigilator.

Adapted Digital Question Papers

The SQA Adapted Digital Question papers are electronic versions, in Adobe PDF, of the hard copy paper. The layout and design of the digital version is similar to that of the paper copy which permits candidates to refer to both digital and paper copies, and also ensures that the assessment itself remains unaltered. The disadvantage of this is that some questions (particularly in mathematics or science papers) do not suit the digital format given that the papers were originally designed to be accessed and completed using pen and paper.

The digital papers have been adapted in two ways: firstly the question and answer papers have ‘answer boxes’ so that a candidate can type into the paper on screen. Candidates can use assistive technologies such as alternative or on-screen keyboards or speech recognition programs, to generate text. Candidates with spelling or writing difficulties use the built-in Acrobat Reader spellchecker or word prediction programs to support their writing (where such support does not give an unfair advantage). Secondly, the papers are ‘speech enabled’ (using TextHelp Systems’ PDFaloud Stamping kit) so that candidates with visual or reading difficulties can listen to the text spoken out by the computer.

PDF was chosen in preference to other formats such as DOC, HTML or Daisy because PDF is stable and reliable; accessible for the majority of candidates who require assessment arrangements; interactive (i.e. candidates can type answers and draw on the digital papers); and low cost in terms of production and use (the Adobe Reader and Browsealoud software that is used by pupils to access the papers is free).

The papers are delivered to schools on CD (one CD per entry per candidate) so that they can be accessed on either networked or standalone computers. While networked machines are recommended because of ease of installation and use, some schools appear to have difficulties getting specialist software (e.g. Browsealoud) installed on networks. When a candidate has completed the assessment, the paper is printed out and returned to SQA for marking with the other candidates’ handwritten or word processed scripts.

Pilot trials and evaluation

2006 pilot trials

Seventy-three pupils trialled digital versions of past papers in 2005. Staff and pupils were supplied with software and supported by researchers from the project team. Thirty-four students in eight different schools subsequently chose to request Adapted Digital Papers for use in 111 examinations in 2006 (Nisbet et al 2006). The majority of the group (20 out of 34 pupils) were described as dyslexic and 7 were dyspraxic. SQA adapted 57 different digital papers, for 19 subject areas, across Intermediate 1 and 2, Standard Grade, and Higher levels. English was the most commonly requested digital paper.

Candidates were asked to complete an evaluation form after sitting each paper and 76 questionnaires were returned in respect of 92 out of 105 (83%) examinations. Students were asked to give the reasons why they chose to use the digital papers; the amount of practice that they had undertaken prior to the examination; whether or not they used the text-to-speech facility; how they answered the paper; whether they required help from staff; whether they would use digital papers again; and whether they felt that SQA should provide digital papers for candidates with additional support needs.

The majority of the pupils chose to use digital papers because they had difficulties with reading, handwriting or spelling, offering comments such as: *'Typing into the paper is much easier than writing. Prolonged writing is difficult and causes a lot of pain.'*; *'It avoids the need for a scribe. I don't like using a scribe.'*; *'It is preferable to see the question when typing in an answer, rather than typing into a blank document with a word processor.'*; *'It would allow me to choose to reread and read any part of the exam quickly without requiring a reader at the time.'*

Text to speech software was used to support reading in 35 out of 92 examinations (36%) by 10 of the 31 students. Most of students who did not choose to use text-to-speech did not have a reading difficulty and were using the digital papers to support their writing or spelling. 9 out of 10 students used text-to-speech to access all of their digital papers, demonstrating that text-to-speech can be helpful for accessing a range of subjects, including for example Biology, Craft and Design, Geography and Physics.

30 out of 31 students felt that SQA should offer digital papers for examinations, suggesting that, for example: *'it is much easier to use than a reader'*; *'it would be easier for markers to read it'*; *'you can see what you've written if your writing is bad'*; *'not as stressful. It's fairer'*. One student felt that papers should only be offered *'to certain people'* and that *'there should be a choice'*.

It is important to consider whether the digital papers confer an advantage (or a disadvantage) compared with candidates who are using traditional papers, and also whether digital papers impact on results compared with other types of support such as readers and scribes. The small numbers of pupils and the wide range for papers made meaningful analysis impossible, but SQA statisticians stated that *'Candidates' results from digital papers are similar to their*

teachers' estimates' and 'there appears to be little difference between [marks awarded for] entries using digital papers and the other entries sat by the same candidates'.

Staff completed an evaluation questionnaire and Figure 1 shows that the staff (n=7) felt that pupils were more confident, independent, motivated and expert when using the digital papers compared with traditional papers and methods of support.

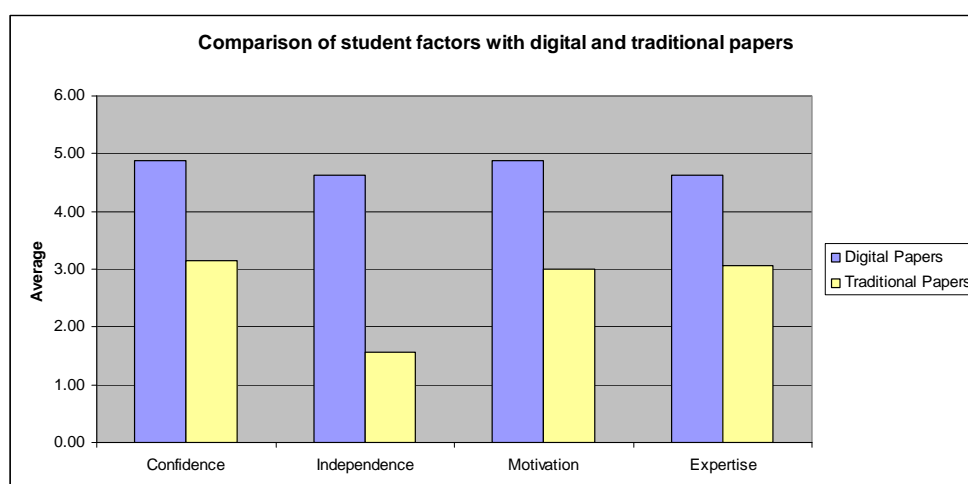


Figure 1: Staff views on pupils' abilities when using digital papers

Staff were asked to score the reliability of the digital papers themselves, and the computers in their schools, on a scale from 1 to 5 (5 is best). On average staff rated the paper reliability 4.75 out of 5 (n=8). The production and quality control procedures developed by SQA therefore appeared to be very effective. The average score for general computer reliability was 4.875.

One of the reasons for developing and trailing the digital papers was because of the demands on staff and accommodation when using scribes and readers, and Figure 2 shows that staff felt that resource demands were lower when using digital papers compared to traditional methods of support. One teacher noted that *'We really appreciate this format of exam paper. The pupils are generally much happier to be independent rather than depend on scribes and readers. This year all our S3 and S4s sat the SG English examination at the same time. If we had had to provide readers and/or scribes for this we would not have been able to staff it.'*

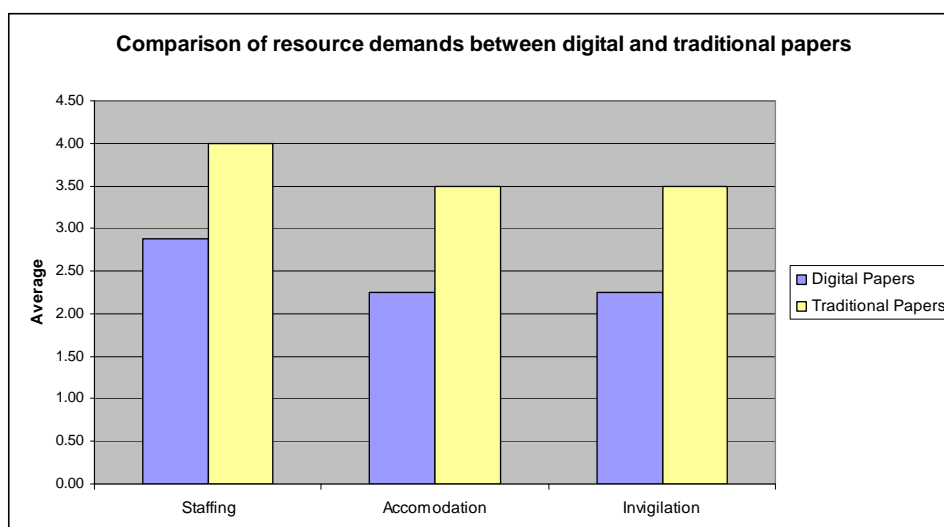


Figure 2: Resource demands with digital papers compared to traditional forms of support

2007 pilot trials

Following the successful 2006 trials, more schools were invited to pilot the papers in 2007. Schools were provided with software and digital past papers on CD, and 200 requests for digital papers for 2007 examinations were made by 12 schools on behalf of 80 candidates (Nisbet 2007). 10 of the 12 schools were mainstream secondary, one was a special school for pupils with physical disabilities, and one was a specialist visual impairment support unit attached to a mainstream school.

Again, papers were requested across a wide range of subjects (Table 4) and levels (Figure 3).

Subject	Digital papers requested	Subject	Digital papers requested
English	219	German	8
Computing	41	Business Management	6
Geography	32	Mathematics	4
French	31	Art & Design	3
Craft & Design	24	Science	2
Administration	19	Social & Voc Skills	2
Biology	17	Accounting	1
History	17	Accounting and Finance	1
Physical Education	11	ESOL	1
Home Economics	10	Human Biology	1
Modern Studies	10	Media Studies	1

Physics	10	Product Design	1
Chemistry	9	Psychology	1
Drama	8		
Total number of Digital Question Papers Requested:			490

Table 4: Number of Digital Papers requested in 2007, by subject

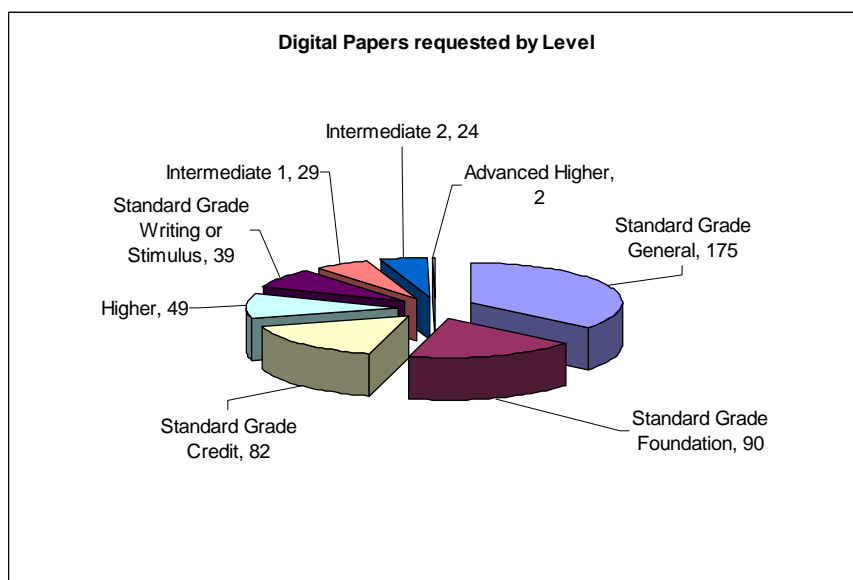


Figure 3: Digital Papers requested in 2007, broken down by Level

We did not feel it was reasonable to ask staff and pupils to complete the same detailed questionnaires that were used in 2006, and so staff were asked to provide information about which pupils used the digital papers and whether or not candidates used the text-to-speech facility. Returns showed that digital papers were used in 80% of the entries for which they had been requested and were not used in 6.5% (no data was returned for the remaining 13.5%). Compared with 2006, a smaller percentage of actual digital papers were reported to be used (70% compared to 95%) and upon further investigation this was found to be because the procedure in 2007 required schools to request digital papers for each examination entry rather than for each individual paper. For example, a request for digital papers for Standard Grade English (the most popular entry) would result in five digital papers being delivered by SQA. A pupil with both reading and writing difficulties would use all five papers, but a pupil with writing difficulties only would probably only use the two question and answer papers.

Digital papers compared with other methods of supporting pupils

One aim of introducing digital papers was to try and reduce reliance on readers and scribes.

Table 5 gives the total number of requests for different types of writing support in the twelve schools.

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J	School K	School L
Scribe	24	21	16	9	144	44	27	109	85	5	45	37
ICT (word processor)	28	67	24	34	33	13	1	114	13	82	21	17
Digital Papers	8	5	20	34	13	7	1	40	8	38	25	1
Transcription with correction	0	7	5	2	5	0	1	0	15	1	1	13
Transcription without correction	0	1	0	1	0	0	1	0	0	0	8	13
PA Referral	0	0	0	0	0	2	0	0	0	9	0	0
Use of tape recorder for responses	0	0	0	0	0	1	0	0	1	0	0	0
Total	60	101	65	80	195	67	31	263	122	135	100	81
ICT and DPs : scribes	3:2	24:7	11: 4	68:9	23:72	5:11	2:27	154:109	21:85	42:1	46:45	18:37

Table 5: 2007 Requests for Assessment Arrangements to support writing and recording (number of entries)

Use of different types of support varies widely across the schools, but taken together, there were more requests for use of a word processor and/or digital paper (Figure 4) than there were for scribes. This is very encouraging because nationally, as we saw in Table 1, there are almost five times as many requests for scribes as there are for use of ICT and so the experience in the pilot schools suggests there is considerable potential for reducing the number of scribes used in schools.

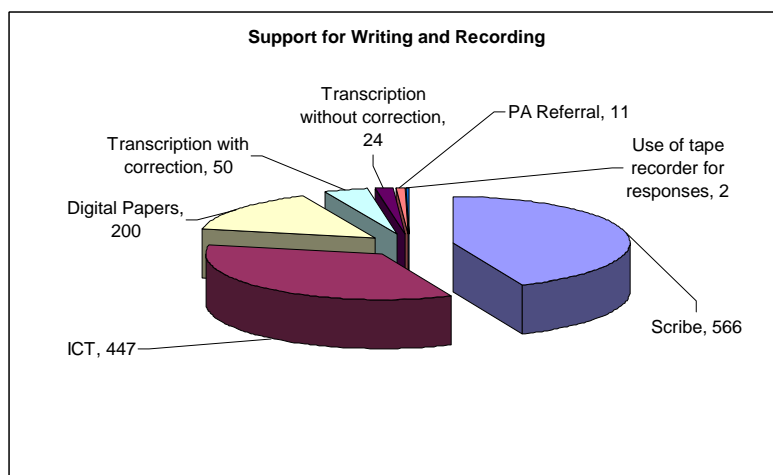


Figure 4: Total number of requests to support writing across all 12 schools

A comparison of the number of requests to support reading is given in Table 6. Only four out of twelve schools used digital papers with text-to-speech software. Uptake varied widely between the different schools, reflecting different needs, policies and also staff and pupil attitudes. Overall, the use of human readers outnumbers the pupils who used digital papers with text-to-speech software by a factor of 18 (Figure 5).

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J	School K	School L
Braille Paper	0	0	0	0	0	0	0	0	0	0	0	3
Coloured Paper	2	18	0	0	0	0	0	0	50	10	0	0
Enlarged Print	4	0	0	0	0	3	0	6	0	0	0	28
Reader	4	64	27	10	140	49	24	110	100	5	34	51
Digital Paper with text to speech software	0	3	6	5	0	0	0	20	0	0	0	0
Total	10	85	33	15	140	52	24	136	150	15	34	82
TRS : Reader	0:1	3:64	2:9	1:2	0:1	0:1	0:1	2:11	0:1	0:1	0:1	0:1

Table 6: 2007 Requests for and use of Assessment Arrangements to support reading (number of entries)

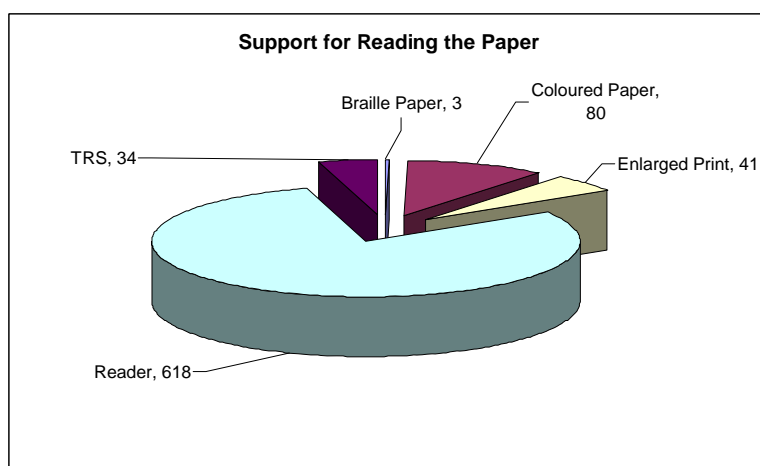


Figure 5: Total number of requests to support reading across all 12 schools

That staff and pupils appear happier to adopt ICT and digital papers in preference to a scribe, but less keen to use digital papers with text-to-speech in place of a reader may be due to several factors which require further investigation. For example, there may be issues with the quality or accuracy of the synthetic voice; the fact that additional specialist software must be installed; or pupils may simply be less familiar and practiced with text-to-speech tools compared to typing. Nonetheless, since usage of text-to-speech did increase significantly in the four schools (from reading 35 papers in 2006 to 95 in 2007), once text-to-speech is introduced it seems that it is well received by pupils and staff.

From examinations to Books for All

Following the success of the two pilots, SQA approved the use of Adapted Digital Question papers for any candidate who requires assessment arrangements in Scotland and in 2008, 509 requests were made by 48 schools on behalf of 209 candidates.

One of the four principles underpinning SQA's policy on assessment arrangements is that *'Any adjustment to the assessment arrangements should reflect, as far as possible, the candidate's normal way of learning and producing work'*. Therefore, if a pupil intends to use digital papers in an examination, one would expect the same techniques to be used in class. This has impacted on policy and provision in some of the schools who have adopted the digital papers, whereby staff have started to create and adapt prelim¹ examination papers,

¹ Pupils sit prelim (preliminary) papers a few months before the exam, for practice and also as evidence for appeal, for example, should the pupil be absent on the day of the actual examination.

worksheets, workbooks and textbooks into accessible digital formats: *'We were very pleased with how the whole Pilot went and this year our prelims and third year exams were in digital format using Word and WordTalk as well as class tests. We have now purchased Acrobat Professional and are working on converting all our class tests into a format similar to that of the SQA exams.'* (Nisbet 2007 p.27)

If there are measurable educational, personal and cost benefits that can be obtained by offering pupils the option of using digital examination papers for a few weeks in May and June, then it is reasonable to suggest that there are likely to be even greater benefits to be gained from providing pupils with books and other learning materials in accessible alternative formats throughout the previous eleven years or so of their school education. This wider perspective was the subject of research which was published last year (Nisbet & Aitken 2007). The Books for All report investigated the need for and availability of learning materials in accessible formats for pupils who are 'print-disabled' and offers a roadmap for developing provision in Scotland. In the year since the report was published a number of issues identified in the report have been addressed: from 1st April 2008, Scottish schools are able to adapt copyright books and other resources into accessible formats for any disabled pupil (including those with dyslexia) without having to seek permission from the rightsholder (previously this dispensation only applied to pupils with visual or physical impairments); a high-quality computer voice with a Scottish accent is now available free of charge from CALL Scotland; a free text-to-speech tool for Microsoft Word is also available from CALL Scotland; and a pilot database for cataloguing and sharing learning materials in accessible formats has been developed by CALL Scotland, Learning and Teaching Scotland and SCRAN.

Examinations are seen as being of great importance by many pupils, parents, staff and by society in general, and the uptake of Adapted Digital Papers demonstrates how this can be used to engender significant change in schools.

Paul D. Nisbet is a Senior Research Fellow at CALL (Communication, Access, Literacy and Learning) Scotland, The Moray House School of Education, University of Edinburgh.

Web links

TextHelp Systems.	http://www.texthelp.com/page.asp
Browsealoud text-to-speech software.	http://www.browsealoud.com/
SQA Assessment Arrangements:	http://www.sqa.org.uk/sqa/14977.html
CALL Scotland sites:	
Adapted Digital Papers:	http://www.AdaptedDigitalExams.org.uk
The Scottish Voice:	http://www.theScottishVoice.org.uk
WordTalk:	http://www.wordtalk.org.uk
Books for All:	http://www.booksforall.org.uk
CALL Scotland:	http://callcentrescotland.org.uk

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